WHAT IS CLAIMED

1. A method of generating a sawtooth waveform at a prescribed frequency, said sawtooth waveform undergoing successive excursions between respective ones of a set of peak and valley portions Vpeak and Vvalley, said method comprising the steps of:

(a) establishing a difference between said set of peak and valley portions in accordance with an input voltage Vin; and

(b) in response to a change in said input voltage Vin, changing the value of said difference between said peak and valley portions and thereby defining a new set of respective peak and valley portions $Vpeak_{NEW}$ and $Vvalley_{NEW}$, and immediately causing said sawtooth waveform to transition from said set of respective peak and valley portions Vpeak and Vvalley to said new set of respective peak and valley portions $Vpeak_{NEW}$ and $Vvalley_{NEW}$ at said prescribed frequency, without undergoing excursions between peak and valley portions other than said new set of peak and valley portions $Vpeak_{NEW}$ and $Vvalley_{NEW}$, respectively.

2. The method according to claim 1, wherein step (a) comprises establishing said difference between said set of peak and valley portions Vpeak and Vvalley in proportion to the difference between said input voltage Vin and said valley voltage Vvalley.

3. The method according to claim 2, wherein step (b) comprises in response to said change in said input voltage Vin, successively charging and discharging a capacitor with a current that is proportional to (Vin_{NEW} - $Vvalley_{NEW}$), with the voltage across said capacitor corresponding to said sawtooth waveform.

4. The method according to claim 3, wherein the value of $Vvalley_{NEW}$ is the same as the value of Vvalley.

5. A high bandwidth feed-forward oscillator for generating a sawtooth waveform at a prescribed frequency, said sawtooth waveform undergoing successive excursions between respective ones of a set of peak and valley portions Vpeak and Vvalley, comprising:

an input port to which a variable input voltage Vin is coupled;

an output port from which said sawtooth waveform is derived;

a network coupled to said input port and being configured to output said peak voltage value Vpeak for said sawtooth output voltage in proportion to a difference between said input voltage Vin and said valley voltage Vvalley;

an amplifier having a first input port coupled to said network and a second input port coupled to receive a

voltage value corresponding to said valley voltage value Vvalley for said sawtooth output voltage;

a current mirror circuit which is coupled to be driven by said first comparator and is operative to produce a current I in proportion to the voltage difference (Vin-Vvalley);

a capacitor coupled to said output port and being alternately charged and discharged by said current I; and

a switching circuit which is operative to supply said current I to said capacitor and thereby charge said capacitor until the voltage across said capacitor reaches said peak voltage value Vpeak, and thereafter sink said current I from said capacitor and thereby discharge said capacitor until the voltage across said capacitor reaches said valley voltage value Vvalley.

6. The high bandwidth feed-forward oscillator according to claim 5, wherein said switching circuit comprises a first comparator having a first input coupled to receive said peak voltage value, and a second input coupled to said output port, a second comparator having a first input coupled to receive said valley voltage value, and a second input coupled to said output port, and a control circuit which is operative to couple said current I to said capacitor and thereby charge said capacitor until the voltage at said output port reaches said peak voltage value Vpeak, thereby causing said first comparator to

change state, and thereafter sink said current I from said capacitor and thereby discharge said capacitor until the voltage at said output port reaches said voltage value Vvalley, thereby causing said second comparator to change state.

7. The high bandwidth feed-forward oscillator according to claim 6, wherein said switching circuit further comprises a flip-flop having a first input coupled to the output of said first comparator and a second input coupled to the output of said second comparator, and an output coupled to steer a charge/discharge path for said capacitor between respective current source and sinks for said current I.

8. The high bandwidth feed-forward oscillator according to claim 5, further comprising temperature compensation circuitry for adjusting said current I produced by said current mirror circuit.

9. The high bandwidth feed-forward oscillator according to claim 8, wherein said temperature compensation circuitry includes a temperature-compensated phase locked loop, which is operative to augment the value of said current I produced by said current mirror circuit and used to source and sink current through said charge/discharge path for said capacitor.

10. A circuit for generating a sawtooth waveform at a prescribed frequency, said sawtooth waveform undergoing successive excursions between respective ones of a set of peak and valley portions Vpeak and Vvalley, said circuit comprising:

a comparator network which is operative to establish said difference between said set of peak and valley portions in accordance with an input voltage Vin; and

a control circuit which is operative, in response to a change in said input voltage Vin, to modify the value of said difference between said peak and valley portions and thereby define a new set of respective peak and valley portions $Vpeak_{NEW}$ and $Vvalley_{NEW}$, and to immediately cause said sawtooth waveform to transition from said set of respective peak and valley portions Vpeak and Vvalley to said new set of respective peak and valley portions $Vpeak_{NEW}$ and $Vvalley_{NEW}$ at said prescribed frequency, without undergoing excursions between peak and valley portions other than said new set of peak and valley portions $Vpeak_{NEW}$ and $Vvalley_{NEW}$, respectively.

11. The circuit according to claim 10, wherein said comparator network is operative to establish said difference between said set of peak and valley portions Vpeak and Vvalley in proportion to the difference between said input voltage Vin and said valley voltage Vvalley.

12. The circuit according to claim 11, wherein said control circuit is operative, in response to said change in said input voltage Vin, to successively charge and discharge a capacitor with a current that is proportional to (Vin_{NEW} - $Vvalley_{NEW}$), with the voltage across said capacitor corresponding to said sawtooth waveform.

13. The circuit according to claim 12, wherein the value of $Vvalley_{NEW}$ is the same as the value of Vvalley.

14. The circuit according to claim 10, wherein said comparator network comprises an input port to which a variable input voltage Vin is coupled, and including a voltage divider network that is operative to output said peak voltage value Vpeak for said sawtooth output voltage in proportion to a difference between said input voltage Vin and said valley voltage Vvalley, and including an amplifier having a first input port coupled to said voltage divider network and a second input port coupled to receive a voltage value corresponding to said valley voltage value Vvalley for said sawtooth output voltage, and a current mirror circuit which is coupled to be driven by said first comparator and is operative to produce a current I in proportion to the voltage difference (Vin-Vvalley); and wherein

said control circuit includes a capacitor coupled to said output port and being alternately charged and discharged by said current I, and a switching circuit which is operative to supply said current I to said capacitor and thereby charge said capacitor until the voltage across said capacitor reaches said peak voltage value Vpeak, and thereafter sink said current I from said capacitor and thereby discharge said capacitor until the voltage across said capacitor reaches said valley voltage value Vvalley.

15. The circuit according to claim 14, wherein said switching circuit comprises a first comparator having a first input coupled to receive said peak voltage value, and a second input coupled to said output port, a second comparator having a first input coupled to receive said valley voltage value, and a second input coupled to said output port, and a control circuit which is operative to couple said current I to said capacitor and thereby charge said capacitor until the voltage at said output port reaches said peak voltage value Vpeak, thereby causing said first comparator to change state, and thereafter sink said current I from said capacitor and thereby discharge said capacitor until the voltage at said output port reaches said voltage value Vvalley, thereby causing said second comparator to change state.

16. The circuit according to claim 15, wherein said switching circuit further comprises a flip-flop having a first input coupled to the output of said first comparator and a second input coupled to the output of said second comparator, and an output coupled to steer a charge/discharge path for said capacitor between respective current source and sinks for said current I.

17. The circuit according to claim 14, further comprising temperature compensation circuitry for adjusting said current I produced by said current mirror circuit.

18. The circuit according to claim 17, wherein said temperature compensation circuitry includes a temperature-compensated phase locked loop, which is operative to augment the value of said current I produced by said current mirror circuit and used to source and sink current through said charge/discharge path for said capacitor.

19. The circuit according to claim 16, wherein said circuit is simplified by removing the amplifier and shorting the first current mirror input MOSFET gate and drain together, this results in a simpler circuit but has more variation in the Vvalley voltage.